

PATENT COOPERATION TREATY

PCT ~

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/KZ2004/000002	International filing date (day/month/year) March 11, 2004 (11.03.2004)	Priority date (day/month/year) March 26, 2003 (26.03.2003)
International Patent Classification (IPC) or national classification and IPC F02B 25/08, 75/28, F01B 7/04		
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<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>	

Date of submission of the demand March 11, 2004 (11.03.2004)	Date of completion of this report April 01, 2005 (01.04.2005)
Name and mailing address of the IPEA/ Facsimile No.	Authorized officer Telephone No.

Box No. 1 Basis of the report

1. With regard to the language, this report is based on:

- ☐ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ the international application as originally filed/furnished
- ☐ the description:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the drawings:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-48	YES
	Claims		NO
Inventive step (IS)	Claims	1-48	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-48	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The conclusion is prepared on the basis of the informational sources quoted in the search report:

D1 – DE 195097 A1
D2 – US 6341583 B1
D3 – RU 2018007 C1
D4 – RU 2133847 C1

D1 or D2 or D3 or D4 provides information on the piston mechanism with diverging pistons including the crankcase with a crankshaft, cylinder with inlet opening, at least two oppositely directed pistons, connecting members and spark plugs in the working chambers formed between the pistons and one outer piston.

D1 and D2 provide the knowledge of the performance of connecting members interacting with three crankpins of the crankshaft with one of the above members being connected with the middle crankpin and the other – with two end pins. At least one piston is a rigid piston on connecting rods the basis of which is screwed on one of the connecting members and placed in the guide channels made in the body of the cylinder parallel to its axle and forms the synchronous group of connecting rods with the movement direction being corresponding to this connecting member (D1).

Connecting members may be located between the crankshaft and the closest piston, internal connecting member is connected to the middle shaft journal and the external – to the outer shafts (D1, D2).

D3 and D4 provide the performance of the crank-hinge frame and slide bars.

However the formula of the invention describes the peculiarities of implementing of the connecting members, connecting rods, guide channels, slide bars, frames, their connections, mutual location and formation of synchronous groups.

Comparison of D1-D4 shows that the difference of the declared invention from the revealed ones is that it additionally contains connecting rods rigidly connected at least with one oppositely directed piston and with the other connecting member and located in the supplementary guide channels parallel to the existing and alternate channels. All the channels have slits in the working surface of the cylinder with the outlets into its cavity so that the collateral borders of the synchronous connecting rods of different directions turned to the cylinder cavity form the active areas of its work surface. The perimeters of the pistons are connected one by one with collateral bodies of the connecting rods of different synchronous groups and thus form work chambers between them.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

The invention submitted provides for the creation of effective piston mechanism which is reliable in terms of operation, simple in terms of making and having the wide range of opportunities. The piston mechanism has the low steel intensity which allows increasing of power density and ensuring the simultaneous execution of different strokes of independent working cycles.

The declared invention described in the independent p. 1 and dependent points 2-48 is the new invention which corresponds to the criteria of inventive step and industrial applicability.

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

There are some remarks on the formula and description of the invention:

Claim 1 indicates that the working chambers are formed between the pistons however claims 42 and 43 state that the working chamber is formed by one piston. Therefore there is a contradiction between the independent and dependent points because the replacement or exclusion of peculiarities of the independent point.

In the expertise opinion the acceptable way out could be the use of the definition "additional" in claims 42 and 43 with regard to chamber 45 formed by the outer piston and head 44 of cylinder 1, i.e. the chamber 45 should be called as is in the description.

To show the direct subordination of the subclaim to several claims of the formula (multiple relationship), the reference thereto shall be indicated with the use of any option. This concerns claims 10, 20, 21, 22, 29 and 32 of the formula of invention.

The claim with the multiple relationship shall not be the basis for the other claims with the multiple relationship (this concerns points 11, 12 and 13 of the formula of invention).

With regard to claim 22 there is a doubt about the term "widen" since from one hand the understanding of its notional content is complicated, and from the other hand the words "increasing the area of their cross section" define the peculiarity of making the relevant lug.

Term "shortened" with regard to pistons and connecting rods (claims 31 and 34) is indefinite because it is hard to understand to what extend they are shortened and with respect to what.

Since claim 1 does not state that the connecting rods have borders and some of them are wide the expertise believes that it is logically to mention the wide borders at the beginning of claim 23.

The "List of reference..." does not contain the term "body" (of the cylinder). Claims 18, 19, 33, 45, 47 and 48 do not contain this term and the description stipulates that the cylinder itself (but not its body) has heads 2 and 44.